Name:

at1121exam_practice: Radicals and Squares (v605)

Question 1

Simplify the radical expressions.

$\sqrt{27}$	$\sqrt{99}$	$\sqrt{20}$
$\sqrt{3 \cdot 3 \cdot 3}$	$\sqrt{3 \cdot 3 \cdot 11}$	$\sqrt{2 \cdot 2 \cdot 5}$
$3\sqrt{3}$	$3\sqrt{11}$	$2\sqrt{5}$

Question 2

Find all solutions to the equation below:

$$2(x+9)^2 + 3 \;=\; 35$$

First, subtract 3 from both sides.

$$2(x+9)^2 = 32$$

Then, divide both sides by 2.

$$(x+9)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 9 = \pm 4$$

Subtract 9 from both sides.

$$x = -9 \pm 4$$

So the two solutions are $x = -5$ and $x = -13$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 14x = 95$$

$$x^2 - 14x + 49 = 95 + 49$$
$$x^2 - 14x + 49 = 144$$
$$(x-7)^2 = 144$$
$$x - 7 = \pm 12$$
$$x = 7 \pm 12$$
$$x = 19 \quad \text{or} \quad x = -5$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 - 12x + 23$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 - 6x) + 23$$

We want a perfect square. Halve -6 and square the result to get 9 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 - 6x + 9 - 9) + 23$$

Factor the perfect-square trinomial.

$$y = 2((x-3)^2 - 9) + 23$$

Distribute the 2.

$$y = 2(x-3)^2 - 18 + 23$$

Combine the constants to get **vertex form**:

$$y = 2(x-3)^2 + 5$$

The vertex is at point $(3, 5)$.